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Approaching the eye from without inward, one finds first the epidermis of the skin, then the corium, then a few irregularly-branched connective-tissue cells, the pia, and, finally, the outer surface of the eye. Surrounding it like a collar is a blood-sinus, which even after two or three years' preservation in alcohol was still filled with corpuscles, whose nuclei came out very sharply on staining in borax carmine.

The cells composing the eye are distinctly columnar throughout, with well-marked nuclei. The eye is balloon-shaped, or pyriform, and the cells on the upper half point towards the centre, while the remainder point towards the long axis of its short stalk. There is some fine thread-like or stringy material in the cavity of the eye which does not take the stain, and which is probably the coagulated remains of some serum or plasma which filled the cavity.

On looking at the upper surface of the head in other unstained, alcoholic, specimens of *Chrysemys picta*, there is no external evidence of the presence of this unpaired organ. In fact, the pineal eye in this type is evidently in a rudimentary condition; possibly in process of degeneration. No part of the outer wall of the optic vesicle of the pineal eye shows evidence of thickening into a lens, such as is found in that situation in many Lacertilia. It approximates, with its hollow stalk, somewhat towards the condition of *Cyclodus*, as described by Spencer, but there is no pigment developed anywhere in the pineal eye of *Chrysemys.*

However, in one specimen of unhatched *Cinosternum pennsylvanicum*, which, through Professor Ryder's kindness, I have had the privilege of examining, there is seen in the median line, half-way between the snout and the front end of the carapax, a clearly defined brownish pigment-spot. Judging from analogy and comparing my results with those of Mr. Spencer, we may expect to find the eye in this species much more highly developed than is the case in *Chrysemys* described above.

These observations are also of greater interest because of the fact that none of the Chelonians, in the adult condition, as far as I am aware, have a parietal foramen developed, such as is found in many Lacertilians. It is therefore clear that the pineal eye in Chelonians cannot at any time during life attain to even the functional importance of that organ in any of the Lizards in which it has hitherto been observed.—*George Fetterolf, Biological Laboratory, University of Pennsylvania,* November 9, 1887.

PSYCHOLOGY.

The Theology of Evolution.[1]—In the pamphlet bearing the above title is contained a statement of the evidence in favor of primitive and creative mind in nature, brought to light by the doctrine of evolution. Its theses may be stated as follows: *First.* The mind of animals and men exercises a directive, though not a creative, power over their movements. This directive power is an evident direction of the course of energy by consciousness, and is, as such, a direct interference with mechanical process. *Second.* Since the evolution of animal types is due to their movements within their environment, and the movements have been inaugurated in conscious states by the directive power of will (*not* free will), the evolution of organic types is due to mind. *Third.* Since protoplasm is sustained as a chemical body against the ordinary chemical forces by the presence of vitality or some of its class of energies, the origin of protoplasm cannot be due to chemical energy, but to some energy of the vital type. This third thesis should be modified so as to read: Since protoplasm is decomposed as a chemical body by the attacks of living micro-organisms only, at ordinary temperatures, it is evident that vital energy possesses a direct control over the chemical energy. And vital energies are believed to possess no peculiarity by which they may be distinguished from the non-vital, excepting the stamp of a pre-existent or present consciousness.

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[1] The Theology of Evolution, a lecture, by E. D. Cope; A Review of the Theology of Evolution, a reply to Dr. Montgomery, by E. D. Cope; The Relation of Mind to Matter, by E. D. Cope; all, 1887, Philadelphia, Arnold and Company.

From these premises it is inferred that there is and has been a primitive mind as an attribute or property of primitive matter. And this mind directs energy profitably to conscious beings and produces advantageous types of automatic energy by cryptopnoy. It thus acts as a building and creating agency, opposing the chemical and physical forces, whose outcome is destruction only, or the "dissipation of energy and the integration of matter."

In the second of the brochures referred to, the articles of the "Theology of Evolution" are stated as follows (p. 28):

"I. Nothing exists excepting tridimensional matter and its properties (or behavior).

"II. The properties of matter are energy (motion) and consciousness.

"III. Consciousness is not a property of universal matter, but is conditioned by the axiomatic qualities of matter, as extension and resistance.

"IV. The mode of motion (energy) of matter is, on the other hand, primitively conditioned by consciousness, but ceases to be so conditioned when it reaches a certain degree of automatism (to be better defined by future research).

"V. Consciousness ultimately disappears from matter and energy which have established automatic conditions; therefore the condition of the persistence of consciousness is the maintenance of will, the antagonist of mechanical automatism.

"VI. Every new process of conscious will creates new (? molecular) machinery in the conscious matter.

"VII. Hence physical and mental development depend on the will.

"VIII. The phylogeny of protoplasm requires a parent substance.

"IX. Since, then, the existence of primitive mind in a primitive physical basis is far more probable than the opposite view, the existence of a Supreme Being is exceedingly probable.

"X. Since will controls the movements and organization of matter, the persistence of human consciousness in other worlds than the earth is possible."

Dr. Edmund Montgomery combats these views in a series of nine articles, published in the *Open Court*, of Chicago, under the heads "Cope's Theology of Evolution" and "Are we the Products of Mind?" He asserts with regard to the theses of Cope's first pamphlet: *first*, that mind does not, because it cannot, control or direct the movements of matter; *second*, that consciousness is not the director of the evolution of living beings; *third*, that "primitive mind in primitive matter" would be of the lowest grade of mind from lack of organization, and could only represent a Deity inferior to man and many of the animals.

Dr. Montgomery also holds that mind is not a property of matter, and further takes the idealistic position in metaphysics that "matter is only a superfluous impediment easily argued away." But at the same time he holds the very distinct and apparently inconsistent opinion that mind can only exist in connection with highly organized protoplasm. His denial that mind can control matter is absolute, and he substitutes for this opinion a theory of "special hypermechanical energies" not yet formulated. The objections of Dr. Montgomery are replied to by Professor Cope in the second and third brochures referred to, and in a fourth in the *Open Court*, of Chicago, entitled "Idealism and Evolution."—*E. D. Cope.*

An Expression of Animal Sympathy.—While riding along a country road in the environs of Cincinnati, Ohio, about the 1st of last October, I noticed a remarkable and very amusing display of animal intelligence. In a field beneath some trees at the bottom of a very high hill stood facing each other a donkey and a young bull. The bull was standing very patiently, slightly nodding his head up and down, while the donkey, with a rather heavy stick about two feet long in his mouth, was scratching his companion's forehead. We stopped our horse and watched the operation for some time. Once the donkey dropped his instrument, but, without hesitation, lowered his head, picked up the club again with his teeth, and continued scratching very gravely, to the evident satisfaction of the bull. We often see two cows "rubbing horns," and whether this was a return for a similar favor from the bull or not, the donkey very clearly realized his poverty in the matter of horns, and happily supplied the deficiency.—*Charles L. Edwards.*